

National Institute of Child Health and Human Development

Intramural Research Program

Behavioral Research in The Laboratory of Comparative Ethology (LCE)

The [Laboratory of Comparative Ethology](#) (LCE) carries out several programs of basic behavioral research investigating cognitive, social-emotional, and physiological development in humans and in nonhuman primates. Research in the **Comparative Behavioral Genetics Section (CBGS)**, headed by Stephen J. Suomi, Ph.D., investigates biobehavioral development from infancy to senescence in rhesus and capuchin monkeys. A primary objective of the CBGS's overall program of research is to study how genetic and environmental factors act and interact to shape individual developmental trajectories across a wide range of biological and behavioral phenomena. To address this basic nature-nurture issue, infants of known parentage, some selectively bred, are studied longitudinally in settings in which selected aspects of their physical and social environments are varied systematically at specific points or periods during development; the monkeys are then maintained under equivalent or comparable conditions thereafter. This approach allows specific gene-environment interactions to be characterized, in addition to facilitating standard heritability calculations and demonstrations of various environmental influences.

A second general objective concerns issues of developmental continuity vs. change and the relative stability of individual differences throughout development. To address these issues, longitudinal designs that repeatedly and frequently sample a host of behavioral and physiological measures throughout major periods of development are incorporated in most CBGS research projects. This approach to longitudinal data collection and analysis facilitates the study of developmental processes, as well as permitting objective evaluation of the developmental continuity and interindividual stability of a wide range of outcome measures. Further, the concomitant (and often simultaneous) collection of behavioral and physiological measures representing multiple systems and levels of analysis throughout these longitudinal studies enables us to examine patterns of covariance between the different measures, both at specific points and during longer periods throughout development. Systematic examination of such patterns of covariance over time can be extremely useful, if not crucial, for generating hypotheses regarding causal pathways for specific developmental processes and/or outcomes.

The third general objective of the CBGS research program concerns the generality of research findings, both across different experimental and field settings and between different species of primates, including humans. To this end, efforts are made to collect data from monkeys living in field environments that allow us to determine (a) to what extent specific findings and/or general developmental principles gleaned from systematic study under controlled laboratory conditions generalize to monkeys living in more naturalistic settings, and (b) whether the phenomena observed in laboratory studies are of any adaptive significance for monkeys in the field. Regarding the larger issue of cross-species generality, the basic topics of study within the CBGS have been selected to encompass phenomena known to occur (or at least have a compelling

analog) at the human level, as well as in other primate species. Thus, the primary foci of the research with rhesus monkeys -- developmentally stable individual differences in biobehavioral reactivity to environmental novelty and challenge, and individual differences in impulsive aggressive behavioral tendencies -- have analogs that can be readily identified in human infants and children and are of considerable current theoretical and clinical interest. Moreover, apparently comparable ranges of individual differences in biobehavioral reactivity are exhibited by capuchin monkey infants, juveniles, and adults. Determining to what extent the observed interindividual differences, their patterns of covariance across different levels of analysis, their relative stability during development, and their long-term consequences seem comparable and/or appear to follow similar “rules” in these very different primate species is a long-term goal of the overall research program.

The main theme of the research program of the **Unit on Developmental Neuroethology (DN)**, headed by John D. Newman, Ph.D., is to understand the mechanisms mediating vocal communication in nonhuman primates. The basic approach is multidisciplinary, employing methodology and conceptual approaches from bioacoustics, ethology, and neuroscience in a research plan designed ultimately to provide an essential understanding of how functional brain circuits develop under the influence of genetically and experientially derived programs to mediate the expression and perception of vocalizations. The theoretical basis for this work arises in part from evidence that the same forebrain structures mediate nonverbal vocal communication in both humans and nonhuman primates and in part from evidence that the acoustic details of vocalizations can serve as “windows” through which we can view normal and abnormal brain function and, therefore, potentially serve as diagnostic indicators of neuropathology. An additional presumption is that at least some forms of auditory communication behavior can ultimately be understood at the cellular level, a goal that potentially yields insights into brain function that are not readily attainable from other approaches.

The primary long-term goal of the Unit is to characterize the mechanisms of vocal production and perception in primates, with major emphasis on vocalizations produced by squirrel monkeys and common marmosets in the contexts of social separation and affiliation. Additional research in the Unit is focused on understanding the mechanisms that activate and promote infant caregiving and other forms of affiliative behavior. In this research, the peptides oxytocin and vasopressin are being investigated with respect to their roles in infant retrieval and carrying by common marmosets.

The **Child and Family Research Section (CFRS)**, headed by Marc. H. Bornstein, Ph.D., investigates dispositional, experiential, and environmental factors that contribute to physical, mental, emotional, and social development in human beings during the early years of life. Laboratory and home-based studies employ a variety of approaches, including psychophysiological recordings, experimental techniques, behavioral observations, standardized assessments, rating scales, interviews, and demographic/census records in both longitudinal and cross-sectional designs. The research goals of the CFRS are to describe, analyze, and assess the capabilities and proclivities of developing children, including their physiological functioning, perceptual and cognitive abilities, emotional and social development, and interactional styles; the nature and consequences of interactions within the family and the social world for children and parents; and influences of children’s exposure to and interactions with the inanimate

environment on their development. Research topics concern the origins, status, and development of diverse psychological constructs, structures, functions, and processes in the first decade of life; effects of child characteristics and activities on parents; and the meaning of variations in parenting and in the family across different sociodemographic and cultural groups.

Sociodemographic comparisons under investigation include family SES, maternal age and employment status, and child parity and daycare experience. Cultural study sites include Argentina, Australia, Belgium, Brazil, Cameroon, England, France, Israel, Italy, Japan, and Kenya, as well as the United States, where intra-cultural as well as cross-cultural comparisons are pursued.

The CFRS also conducts a broad program of research in behavioral pediatrics that investigates questions at the interface of child development, biology, and health. This research has several different facets, including the role of vagal function in psychological development, fetal growth and development and their predictive validity for postnatal function, the impact of deafness in child development and their predictive validity for postnatal function, the impact of deafness in child development and family life, development after *in utero* cocaine exposure, and children's knowledge, implementation, and evaluation of strategies for coping with stressful medical experiences.

Finally, the **Section on Social and Emotional Development (SSED)**, headed by Michael E. Lamb, Ph.D., applies field-based methodologies to a diverse array of developmental problems. One major research project focuses on evaluating the effects of contrasting care arrangements on child development in the context of individual and contextual factors and involves two longitudinal studies of children being conducted in Sweden and Berlin. The Swedish study has followed children from their original enrollment in day care as infants and toddlers to their current status as high school seniors, assessing their social, emotional and cognitive skills and attitudes as a function of differences in early day care experience at selected points throughout the study. The Berlin longitudinal study assesses the psychophysiological and behavioral tendencies of infants in order to characterize the effects of prior individual differences in emotional reactivity and mother-infant attachment on adaptation to out-of-home center care.

The goal of the second major SSED research project is to develop and assess techniques for enhancing the informativeness of child witnesses and for evaluating the credibility of their accounts. Most studies in the research program are focused on the relationship between interviewer style and the quality of information provided by young children. Several studies have confirmed that open-ended questions elicit longer and more detailed responses than more focused questions, regardless of the number of incidents experienced or the language in which the interview is conducted. Other studies have shown that interviewers can increase the length and richness of children's accounts by following SSED-designed protocols designed to probe recall memory and reduce the reliance on more focused questions, which are more likely to elicit erroneous information. These interview protocols are currently being evaluated by investigative agencies in Israel, the U.K. and the U.S. and will soon be evaluated in Sweden as well. Factors that might affect interviews of very young children, as well as children who are reluctant to disclose, are currently of special interest. Another SSED study is exploring the effects of domestic violence on children who were either victims of physical abuse, witnesses of spousal abuse, both victims and witnesses, or neither. Other studies are concerned with the ways in

which variations among rearing environments, as indexed by parental beliefs, values, and practices, affect children's development, as well as providing detailed descriptions of interactions between parents and infants in diverse ecological contexts.